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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,346	09/24/2003	Mohammad Jaber Borran	088245-0108	7074

23524	7590	10/18/2007
FOLEY & LARDNER LLP 150 EAST GILMAN STREET P.O. BOX 1497 MADISON, WI 53701-1497		

EXAMINER	
BURD, KEVIN MICHAEL	

ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
10/18/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/671,346	Applicant(s) BORRAN ET AL.	
	Examiner Kevin M. Burd	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 41,42,45-50,53-58 and 61-75 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 41,42,45-50,53-58 and 61-75 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

This office action, in response to the amendment and the request for continued examination, is a non-final office action.

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/9/2007 has been entered.

***Response to Arguments***

2. Applicant's arguments with respect to claims 41, 42, 45-50 and 53-58 have been considered but are moot in view of the new grounds of rejection.
3. Rejections to the previously pending claims and the newly added claims are stated below.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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4. Claims 41, 42, 45, 46, 49, 50, 53, 54, 57, 58 and 61-75 are rejected under 35 U.S.C. 102(b) as being anticipated by "On Design Criteria and Construction of Non-coherent Space-Time Constellations" by Mohammad Jaber Borran et al published 10/22/2001.

Regarding claims 41, 42, 49, 50, 57 and 58, Borran discloses a method and apparatus for transmitting a signal. A bit stream is input and a characteristic for a wireless channel is determined. The characteristic is the signal to noise ratio (page 2, II system model). The constellation is selected by determining an optimal constellation from all possible constellations. Adopting the KL distance as performance criterion, the signal set design criterion in general will be maximization of the minimum KL distance between distributions assigned to the signal points (page 3, III design criterion). To use the determined constellations, the bit stream will be converted to symbols and transmitted (page 1, I introduction).

Regarding claims 45 and 53, the signal to noise ratio is determined from the received signal (page 2, II system model).

Regarding claims 46 and 54, the signal to noise ratio is determined from the received signal (page 2, II system model). The received signal is determined by the number of transmit and receive antennas used in the system.

Regarding claims 61-75, figure 2 discloses the constellations used to transmit the transmission signal. Figure 2 is a two dimensional representation of the selected signal constellations. The constellations comprise sub-constellations for each ring shown in the figure.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 47, 48, 55 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over "On Design Criteria and Construction of Non-coherent Space-Time Constellations" by Mohammad Jaber Borran et al published 10/22/2001 in view of Won (US 7,269,436).

Regarding claims 47, 48, 55 and 56, Borran discloses the method and apparatus stated above. Borran does not disclose the number of transmit antennas is determined from a message received over the wireless channel. Won discloses the transmitter can estimate the channel covariance matrix using a preamble transmitted from the receiver. The transmitter can also update the number of antennas and the power allocation according to the eigenvalues of the estimated covariance matrix (column 7, lines 42-48). Therefore, the number of transmit antennas is determined from the information in the preamble (header) of the received signal. It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teaching of Won into the method and apparatus of Borran. Controlling the number of antennas used according the channel conditions will minimize the power consumed by the transmitter, reducing the cost of operating the transmission system.

***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Borran et al (US 2006/0203941) discloses a method of transmitting a signal by using the Kullback-Leibler distance between distributions assigned to the transmitted symbols as a performance criterion and derive a design criterion based on maximizing the minimum KL distance between constellation points (abstract). This is discussed throughout the provisional application.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Burd whose telephone number is (571) 272-3008. The examiner can normally be reached on Monday - Friday 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on (571) 272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin M. Burd  
10/15/2007

  
**KEVIN BURD**  
**PRIMARY EXAMINER**